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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,296	06/12/2001	Masakazu Matsugu	35.G2827	3025

5514   7590   12/22/2004

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER
BELL, MELTIN

ART UNIT	PAPER NUMBER
2121	

DATE MAILED: 12/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application N .		Applicant(s)	
Office Action Summary		09/878,296		MATSUGU, MASAKAZU	
		Examin r		Art Unit	
		Meltin Bell		2121	

-- The MAILING DATE of this communication appears on th cov r sh et with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _10 September 2004_.

2a)☐ This action is **FINAL.**   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-66_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-66_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10 September 2004_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☒ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _9/10/04_.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

This non-final action is responsive to application **09/878,296** filed 06/12/2001 as

well as the Specification Changes, Drawing Corrections, Information Disclosure

Statement and Amendment all filed 9/10/04. Claims 1-66 filed by the applicant have

been entered and examined. An action on the merits of claims 1-66 appears below.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on

applications 181480/2000, 181487/2000 and 181488/2000 filed in Japan on **6/16/00**.

Claim Rejections - 35 USC § 103

Applicant's arguments have been considered, but are moot in view of this new

grounds of rejection. The following is a quotation of 35 U.S.C. 103(a) which forms the

basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-15, 19-24 and 66 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Fukushima* USPN 5,058,184 "Hierarchical information processing

system" (October 15, 1991) in view of *Eckmiller et al* "Information Processing in Biology-

Inspired Pulse Coded Neural Networks" (1993) in view of *Johnson* USPN 5,664,065

"Pulse-coupled automatic object recognition system dedicatory clause" (September 2,

1997) and in further view of *Iwata et al* USPN 6,088,490 "Apparatus for processing two-

dimensional information" (July 11, 2000 Patent Date; March 25, 1998 Filing Date).

Regarding claim 1:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range while

Eckmiller et al teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements outputs a pulse

signal (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for classifying event patterns (*Eckmiller et al*, page 645, paragraph 2,

"Recognition and Tracking ... of neuron C"), reducing transmission in cluttered

environments (*Johnson*, column 2, lines 23-58, "the receptive field...in the scene") and

performing detection of two-dimensional images (*Iwata et al*, column 1, lines 62-67, "To

solve the...as an image"; column 2, lines 1-5, "figure, etc., compression...images,

figures, etc."). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made, to modify *Fukushima* as taught by *Eckmiller et al,*

Johnson and *Iwata et al* for the purpose of classifying event patterns, reducing

transmission and performing detection.

Regarding claim 2:

The rejection of claim 2 is similar to that for claim 1 as recited above since the stated

limitations of the claim are met by the references. Claim 2's limitations difference is

taught in *Fukushima*:

- the plurality of signal processing elements comprises:

- a feature detection element that belongs to a feature detection layer for extracting a

predetermined feature, and a feature integration element that belongs to a feature

integration layer that integrates outputs from the feature detection layer according to a

predetermined method and outputs a result of the integration (Fig. 1)

- the predetermined ones among the plurality of signal processing elements are the

feature detection elements that receive inputs from a plurality of the feature integration

elements (Figs. 7-12)

Regarding claim 3:

The rejection of claim 3 is the same as that for claim 2 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 4:

The rejection of claim 4 is the same as that for claim 2 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 5:

The rejection of claim 5 is the same as that for claim 2 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 6:

The rejection of claim 6 is similar to that for claim 5 as recited above since the stated limitations of the claim are set forth in the references. Claim 6's limitations difference is taught taught in *Fukushima*:

- wherein each of the feature integration elements of the feature integration layers has a local receptive field structure for receiving the signals from a plurality of feature detection elements which exist in a local range in a feature detection layer of a preceding stage and which individually detect an identical feature (column 16, lines 66-68, "At each stage...is used to"; column 17, lines 1-42, "denote the layer...usually still responds"; column 24, lines 25-39, "The influence of...more features simultaneously")

Regarding claim 7:

The rejection of claim 7 is similar to that for claim 5 as recited above since the stated limitations of the claim are set forth in the references. Claim 7's further limitations are taught in *Fukushima*:

- wherein feature detection elements of the feature detection layer receive signals from feature integration elements associated with different features in a feature integration layer in the preceding stage to detect a higher-order feature (column 16, lines 66-68, "At each stage...is used to"; column 17, lines 1-42, "denote the layer...usually still responds"; column 24, lines 25-39, "The influence of...more features simultaneously")

Regarding claim 8:

The rejection of claim 8 is similar to that for claim 2 as recited above since the stated limitations of the claim are set forth in the references. Claim 8's limitations difference is taught taught in *Johnson*:

- wherein at least some of the feature detection layers comprise a plurality of filters for performing a local spatial frequency analysis related to a component in a predetermined direction (column 4, lines 10-20, "The present invention...numbers of edges"; column 7, lines 24-45, "FIG. 9 is a...a parallel manner")

Regarding claim 9:

The rejection of claim 9 is similar to that for claim 2 as recited above since the stated limitations of the claim are set forth in the references. Claim 9's limitations difference is taught in *Fukushima*:

- wherein the plurality of feature detection elements existing in the same receptive field

of the feature integration elements output pulses for a predetermined pattern (column

16, lines 66-68, "At each stage...is used to"; column 17, lines 1-42, "denote the

layer...usually still responds"; column 24, lines 25-39, "The influence of...more features

simultaneously")

Johnson:

- wherein the plurality of feature detection elements output pulses in phase-

synchronization with each other for a predetermined pattern (column 3, lines 31-59,

'While the pulse...from "1" to "0"')

Regarding claim 10:

The rejection of claim 10 is the same as that for claim 2 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 11:

The rejection of claim 11 is similar to that for claim 2 as recited above since the stated

limitations of the claim are set forth in the references. Claim 11's limitations difference

is taught in *Fukushima*:

- wherein the feature detection layer comprises timing elements appendant to the

feature detection elements in the layer, and the timing elements output pulses at

predetermined pulse intervals to issue signals of the phase synchronization for feature

detection calculating elements on the basis of the output from the feature integration

elements on the same receptive field of a layer in the preceding stage (column 16, lines

66-68, "At each stage...is used to"; column 17, lines 1-42, "denote the layer...usually

still responds"; column 24, lines 25-39, "The influence of... more features

simultaneously")

Regarding claim 12:

The rejection of claim 12 is the same as that for claim 11 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 13:

The rejection of claim 13 is similar to that for claim 2 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 14:

The rejection of claim 14 is similar to that for claim 2 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 15:

The rejection of claim 15 is similar to that for claim 1 as recited above since the stated

limitations of the claim are set forth in the references. Claim 15's limitations difference

is taught in *Iwata et al*:

- wherein the plurality of signal processing elements are connected through the

intermediary of connecting means, and the connecting means carries out predetermined

modulation on an output pulse signal of one of the signal processing elements and

transmits the modulated output pulse signal to the other of the signal processing

elements (Abstract, "A two-dimensional information... by the detector")

Regarding claim 19:

The rejection of claim 19 is similar to that for claim 15 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 20:

The rejection of claim 20 is similar to that for claim 1 as recited above since the stated limitations of the claim are set forth in the references. Claim 20's limitations difference is taught in *Johnson*:

- wherein the predetermined ones among the plurality of signal processing elements output pulse signals at output levels based on the weighted sum obtained by multiplying a plurality of pulse signals received within the predetermined time range by predetermined weighting coefficient values, which temporally change, and adding the results (column 2, lines 9-21, "Receptive Field Structures...given spatial region")

Regarding claim 21:

The rejection of claim 21 is similar to that for claim 1 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 22:

The rejection of claim 22 is similar to that for claim 1 as recited above since the stated limitations of the claim are set forth in the references.

Regarding claim 23:

The rejection of claim 23 is similar to that for claim 2 as recited above since the stated limitation of the claim are set forth in the references. Claim 23's limitations difference is taught in *Johnson*:

- a feature position detection layer that receives an output from the feature integration

layer and outputs information regarding the position where a predetermined feature or

pattern exists (column 4, lines 10-20, "The present invention...numbers of edges";

column 7, lines 24-45, "FIG. 9 is a...a parallel manner")

Fukushima:

- a feature position detection layer that receives an output from the feature integration

layer and outputs information regarding the position where a predetermined feature or

pattern exists (column 17, lines 37-42, "On the other...usually still responds")

Regarding claim 24:

The rejection of claim 24 is similar to that for claim 23 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 66:

Fukushima teaches,

- receiving a pattern from an input section (Fig. 1)

- subjecting the received pattern to detection on a predetermined plurality of features

thereby to detect a predetermined pattern included in the pattern by employing a

plurality of signal processing elements (column 4, lines 58-68, "the neural

network...single line showing"; column 5, lines 1-22, "the existence of...in FIG. 2")

- wherein the step of subjecting the received pattern to detection includes the steps of

- outputting a signal to another signal processing element or outside from each of the

plurality of signal processing elements in response to an input from the input section or

another signal processing element (Figs. 7-14)

- outputting signals, from predetermined ones among the plurality of signal processing

elements, at output levels based on arrival time patterns of a plurality of signals (column

25, lines 34-68, 'FIGS. 16-18 show the...new response thus'; column 26, lines 1-6,

'elicited is shown...of "2" appears")

However, *Fukushima* doesn't explicitly teach outputting a pulse signal from each of

predetermined ones among the plurality of signal processing elements, with an output

value corresponding to an arrival time pattern of a plurality of pulse-signals input from a

plurality of signal processing elements within a predetermined time range while

Eckmiller et al teaches,

- outputting a pulse signal (Fig. 1) from each of predetermined ones among the plurality

of signal processing elements (page 643, Computational Neuroscience section,

paragraph 2, "Various neuroscientific studies ... 1985. Other studies" and page 644,

paragraph 1, "discussed the generation ... visual stimulus features"), with an output

value corresponding to an arrival time pattern (Abstract, "Most current artificial ... the

nervous system"; Fig. 2) of a plurality of pulse-signals input from a plurality of signal

processing elements within a predetermined time range (page 645, paragraph 1, "The

fully parallel ... recently been published"; page 647, paragraph 1, "Simulation results

showed ... already caused non-recognition")

Johnson teaches,

- outputting a pulse signal to another signal processing element or outside from each of

the plurality of signal processing elements in response to an input from the input section

or another signal processing element (Abstract, "The pulse-coupled automatic...to the

segment"; Fig. 1)

Iwata et al teaches,

- outputting pulse signals, from predetermined ones among the plurality of signal

processing elements (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The

dynamic range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high

relative accuracy")

Motivation - The portions of the claimed method would have been a highly desirable

feature in this art for classifying event patterns (*Eckmiller et al*, page 645, paragraph 2,

"Recognition and Tracking ... of neuron C"), reducing transmission in cluttered

environments (*Johnson*, column 2, lines 23-58, "the receptive field...in the scene") and

performing detection of two-dimensional images (*Iwata et al*, column 1, lines 62-67, "To

solve the...as an image"; column 2, lines 1-5, "figure, etc., compression...images,

figures, etc."). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made, to modify *Fukushima* as taught by *Eckmiller et al*,

Johnson and *Iwata et al* for the purpose of classifying event patterns, reducing

transmission and performing detection.

Claims 16-18, 25-36 and 41-44 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Fukushima* in view of *Eckmiller et al* in view of *Johnson* in view of

Iwata et al and in further view of *Richards et al* USPN 6,178,207 "Aircraft combat

training signal processing system" (January 23, 2001 Patent Date; January 9, 1998

Filing Date).

Regarding claim 16:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range or wherein the

modulation is implemented to delay a pulse phase while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

- wherein the plurality of signal processing elements are connected through the

intermediary of connecting means, and the connecting means carries out predetermined

modulation on an output pulse signal of one of the signal processing elements and

transmits the modulated output pulse signal to the other of the signal processing

elements (Abstract, "A two-dimensional information...by the detector")

Richards et al teaches,

- wherein the modulation is implemented to delay a pulse phase (column 17, lines 49-

67, "the vector summer adds...information. For example"; column 18, lines 1-19,

"delays might be...pulse position modulation")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for ensuring accurate and reliable detection with flexible data rates

(*Richards et al,* Abstract, "An ASIC chip...aircraft operational environment"), classifying

event patterns (*Eckmiller et al*, page 645, paragraph 2, "Recognition and Tracking ... of

neuron C"), reducing transmission in cluttered environments (*Johnson*, column 2, lines

23-58, "the receptive field...in the scene") and performing detection of two-dimensional

images (*Iwata et al*, column 1, lines 62-67, "To solve the...as an image"; column 2, lines

1-5, "figure, etc., compression...images, figures, etc."). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made, to modify

Fukushima as taught by *Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the

purpose of ensuring accurate/reliable detection, classifying event patterns, reducing

transmission and performing detection.

Regarding claim 17:

The rejection of claim 17 is similar to that for claim 16 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 18:

The rejection of claim 18 is similar to that for claim 16 as recited above since the stated limitations of the claim are set forth in the references. Claim 18's limitations difference is taught in *Richards et al*:

- wherein the delay amount of the pulse phase remains substantially constant regardless of the type of a feature (column 21, lines 39-46, "Integration begins either...of inertial measurements")

Regarding claim 25:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and performs detection related to a plurality of predetermined features on a pattern input by the input means so as to detect a predetermined pattern included in the pattern (column 4, lines 58-68, "the neural network...single line showing"; column 5, lines 1-22, "the existence of...in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another signal processing element or outside in response to an input from the input means or another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-68, 'FIGS. 16-18 show the...new response thus'; column 26, lines 1-6, 'elicited is shown...of "2" appears")

- the pattern detecting means has a plurality of processing layers composed of a

plurality of neuron elements arranged in parallel as the signal processing elements, the

neuron elements receiving a plurality of signals and outputting pulse signals (Abstract,

"Plural efferent signal...the input pattern")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range or the

synaptic connection means imparts a specific phase shift amount to the pulse signals

output from the plurality of neuron elements while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic... to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

- the pulse signals output from a plurality of neuron elements of another layer to at least

one of the neuron elements of a predetermined one of the processing layers are input

through the intermediary of a bus line common to synaptic connection means provided

for each of the plurality of neuron elements, and to the plurality of neuron elements

(Abstract, "A two-dimensional information...by the detector")

Richards et al teaches,

- the synaptic connection means imparts a specific pulse phase shift amount to the

pulse signals output from the plurality of neuron elements (column 22, lines 13-49, "the

transmit path...and PPM waveforms")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for ensuring accurate and reliable detection with flexible data rates

(*Richards et al,* Abstract, "An ASIC chip...aircraft operational environment"), classifying

event patterns (*Eckmiller et al*, page 645, paragraph 2, "Recognition and Tracking ... of

neuron C"), reducing transmission in cluttered environments (*Johnson*, column 2, lines

23-58, "the receptive field...in the scene") and performing detection of two-dimensional

images (*Iwata et al*, column 1, lines 62-67, "To solve the...as an image"; column 2, lines 1-5, "figure, etc., compression...images, figures, etc."). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Fukushima* as taught by *Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the purpose of ensuring accurate/reliable detection, classifying event patterns, reducing transmission and performing detection.

Regarding claim 26:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and performs detection related to a plurality of predetermined features on a pattern input by the input means so as to detect a predetermined pattern included in the pattern (column 4, lines 58-68, "the neural network...single line showing"; column 5, lines 1-22, "the existence of...in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another signal processing element or outside in response to an input from the input means or another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-68, 'FIGS. 16-18 show the...new response thus'; column 26, lines 1-6, 'elicited is shown...of "2" appears")

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or

scale levels on patterns received from the input means (column 25, lines 16-18, "We will

now...network is L = 3")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range, processing at

different scale levels or resolutions or multiplex processing while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or

scale levels on patterns received from the input means (column 14, lines 11-60, "The

high data rate...time of arrival")

- multiplex processing means for coupling the outputs of the plurality of processing

means (Fig. 11, item 1118)

- wherein each of the plurality of processing means comprises a plurality of feature

detection elements, as the signal processing elements, that detect and output a plurality

of features associated with individual points obtained by sampling the input data

according to a predetermined method (column 22, lines 13-49, "the transmit path...and

PPM waveforms")

- the multiplex processing means couples the outputs of the plurality of feature detection

elements (Fig. 18, items 414, 1830, 1832)

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for ensuring accurate and reliable detection with flexible data rates

(*Richards et al,* Abstract, "An ASIC chip...aircraft operational environment"), classifying

event patterns (*Eckmiller et al*, page 645, paragraph 2, "Recognition and Tracking ... of

neuron C"), reducing transmission in cluttered environments (*Johnson*, column 2, lines

23-58, "the receptive field...in the scene") and performing detection of two-dimensional

images (*Iwata et al*, column 1, lines 62-67, "To solve the...as an image"; column 2, lines

1-5, "figure, etc., compression...images, figures, etc."). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made, to modify

Fukushima as taught by *Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the

purpose of ensuring accurate/reliable detection, classifying event patterns, reducing

transmission and performing detection.

Regarding claim 27:

The rejection of claim 27 is similar to that for claim 26 as recited above since the stated

limitations of the claim are set forth in the references. Claim 27's limitations difference

is taught in *Fukushima*:

- the plurality of processing means make up a hierarchical network structure (Title,

"Hierarchical Information Processing System")

Richards et al:

- the multiplex processing means selects a resolution or scale level, or makes setting for

coupling processed outputs of a plurality of resolutions or scale levels on the basis of a

predetermined plurality of outputs among the outputs of the feature detection elements

that correspond to the processing results in respective intermediate hierarchies of the

processing means for a plurality of resolutions or scale levels (column 23, lines 43-67,

"Timing Adjustment of...faster system clock"; column 24, lines 1-44, "In contrast,

with...the system clock")

Regarding claim 28:

The rejection of claim 28 is the same as that for claim 27 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 29:

The rejection of claim 29 is the same as that for claim 27 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 30:

The rejection of claim 30 is similar to that for claim 26 as recited above since the stated

limitations of the claim are set forth in the references. Claim 30's limitations difference

is taught in *Richards et al*:

- wherein each of the plurality of processing means comprises a plurality of hierarchical

processing layers, and the multiplex processing means refers to intermediate

processing results at processing layers of different hierarchical levels thereby to select a

resolution or scale level (column 23, lines 43-67, "Timing Adjustment of...faster system

clock"; column 24, lines 1-44, "In contrast, with...the system clock")

Regarding claim 31:

The rejection of claim 31 is the same as that for claim 29 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 32:

The rejection of claim 32 is similar to that for claim 26 as recited above since the stated

limitations of the claim are set forth in the references. Claim 32's limitations difference

is taught in *Fukushima*:

- wherein the plurality of processing means have feature detection layers for detecting

features of a predetermined plurality of feature categories (column 5, lines 57-66, "an

output response...the input cell-layer")

Richards et al

- wherein the plurality of processing means have feature detection layers for detecting

features at different resolutions or scale levels on each of a predetermined plurality of

feature categories (column 23, lines 43-67, "Timing Adjustment of...faster system

clock"; column 24, lines 1-44, "In contrast, with...the system clock")

Regarding claim 33:

The rejection of claim 33 is the same as that for claim 32 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 34:

The rejection of claim 34 is similar to that for claim 32 as recited above since the stated

limitations of the claim are set forth in the references. Claim 34's limitations difference

is taught in *Johnson*:

- wherein the feature detection layer locally performs spatial filtering for different spatial

frequencies (column 1, lines 1-22, "and/or temporal groups...given spatial region")

Regarding claim 35:

The rejection of claim 35 is similar to that for claim 32 as recited above since the stated

limitations of the claim are set forth in the references. Claim 35's limitations difference is

taught in *Johnson*:

- wherein each feature detection element of the feature detection layer detects a

plurality of features at different resolutions or scale levels in a local, identical region of

input data (column 1, lines 1-22, "and/or temporal groups...given spatial region")

Regarding claim 36:

The rejection of claim 36 is the same as that for claim 32 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 41:

The rejection of claim 41 is similar to that for claim 26 as recited above since the stated

limitations of the claim are set forth in the references. Claim 41's limitations difference

is taught in *Richards et al*:

- the processing means comprises:

- a plurality of feature detection elements for detecting a plurality of features at individual

points obtained by sampling the input data according to a predetermined method

(column 25, lines 62-67, "The present invention...aircraft. The demodulator"; column

26, lines 1-31, "permits quicker response...invention is applicable")

- control means that integrates the plurality of the outputs of the feature detection

elements of the plurality of processing means at different resolutions or scale levels so

as to carry out control related to resolutions or scale levels (Abstract, "An ASIC

chip...aircraft operational environment"; Fig. 4, item 210)

Regarding claim 42:

The rejection of claim 42 is the same as that for claim 41 as recited above since the

stated limitations of the claim are set forth in the references.

Regarding claim 43:

The rejection of claim 43 is similar to that for claim 41 as recited above since the stated

limitations of the claim are set forth in the references. Claim 43's limitations difference

is taught in *Richards et al*:

- wherein the control means controls the activation degree of the feature detection

element on the basis of a resolution or a scale level (column 25, lines 22-29, "A

peripheral register...register load signal 1922")

Regarding claim 44:

The rejection of claim 44 is the same as that for claim 41 as recited above since the

stated limitations of the claim are set forth in the references. Claim 44's limitations

difference is taught in *Richards et al*:

- wherein the control means converts or copies a signal of a predetermined resolution or

scale into a signal of another resolution or scale level according to a predetermined

method, and distributes the resulting signal in a learning mode (column 18, lines 25-36,

"Information can be...bit is indicated")

Therefore, claim 44 is rejected under the same rationale as claim 41.

Claims 37-38 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable

over *Fukushima* in view of *Eckmiller et al* in view of *Johnson* in further view of *Iwata et*

al in further view of *Richards et al* and in further view of *Carrieri et al* USPN 5,631,469

"Neural network computing system for pattern recognition of thermoluminescence

signature spectra and chemical defense" (May 20, 1997).

Regarding claim 37:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or scale levels on patterns received from the input means (column 25, lines 16-18, "We will now...network is L = 3")

- wherein the plurality of processing means have feature detection layers for detecting features of a predetermined plurality of feature categories (column 5, lines 57-66, "an output response...the input cell-layer")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the plurality of signal processing elements outputs a pulse signal with an output value corresponding to an arrival time pattern of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range, processing at different scale levels or resolutions, multiplex processing or sensitivity features approximated by a basis function while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page 643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies ... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ... visual stimulus features") outputs a pulse signal (Fig. 1) with an output value corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range (page 645, paragraph 1, "The fully parallel ... recently been published"; page 647, paragraph 1, "Simulation results showed ... already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to
another signal processing element or outside in response to an input from the input
means or another signal processing element (Abstract, "The pulse-coupled
automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse
signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic
range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative
accuracy")

Richards et al teaches,

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or
scale levels on patterns received from the input means (column 14, lines 11-60, "The
high data rate...time of arrival")

- multiplex processing means for coupling the outputs of the plurality of processing
means (Fig. 11, item 1118)

- wherein each of the plurality of processing means comprises a plurality of feature
detection elements, as the signal processing elements, that detect and output a plurality
of features associated with individual points obtained by sampling the input data
according to a predetermined method (column 22, lines 13-49, "the transmit path...and
PPM waveforms")

- the multiplex processing means couples the outputs of the plurality of feature detection

elements (Fig. 18, items 414, 1830, 1832)

- wherein the plurality of processing means have feature detection layers for detecting

features at different resolutions or scale levels on each of a predetermined plurality of

feature categories (column 23, lines 43-67, "Timing Adjustment of...faster system

clock"; column 24, lines 1-44, "In contrast, with...the system clock")

Carrieri et al teaches,

- wherein the feature detection layer includes a plurality of computing elements having

sensitivity features approximated by a basis function that has locally different directional

selectivities at different resolutions or scale levels for a feature category to be detected

(column 18, lines 22-64, "the neural network filter...on the RBF")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for recognizing groups (Carrieri et al, column 7, lines 62-64, "When

detecting multiple ... constant intensity proportion") ensuring accurate and reliable

detection with flexible data rates (Richards et al, Abstract, "An ASIC chip...aircraft

operational environment"), classifying event patterns (Eckmiller et al, page 645,

paragraph 2, "Recognition and Tracking ... of neuron C"), reducing transmission in

cluttered environments (Johnson, column 2, lines 23-58, "the receptive field...in the

scene") and performing detection of two-dimensional images (Iwata et al, column 1,

lines 62-67, "To solve the...as an image"; column 2, lines 1-5, "figure, etc.,

compression...images, figures, etc."). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made, to modify Fukushima as

taught by *Carrieri et al, Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the

purpose of recognizing groups, ensuring accurate/reliable detection, classifying event

patterns, reducing transmission and performing detection.

Regarding claim 38:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

- the plurality of signal processing elements comprises:

- a feature detection element that belongs to a feature detection layer for extracting a

predetermined feature, and a feature integration element that belongs to a feature

integration layer that integrates outputs from the feature detection layer according to a predetermined method and outputs a result of the integration (Fig. 1)

- the predetermined ones among the plurality of signal processing elements are the feature detection elements that receive inputs from a plurality of the feature integration elements (Figs. 7-14)

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the plurality of signal processing elements outputs a pulse signal with an output value corresponding to an arrival time pattern of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range or the feature detection layer detects a plurality of features for a plurality of resolutions or scale levels for a pattern received from the input means while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page 643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies ... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ... visual stimulus features") outputs a pulse signal (Fig. 1) with an output value corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range (page 645, paragraph 1, "The fully parallel ... recently been published"; page 647, paragraph 1, "Simulation results showed ... already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to another signal processing element or outside in response to an input from the input means or another signal processing element (Abstract, "The pulse-coupled automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative accuracy")

Richards et al teaches,

- wherein the feature detection layer detects a plurality of features for a plurality of resolutions or scale levels for a pattern received from the input means (column 23, lines 43-67, "Timing Adjustment of...faster system clock"; column 24, lines 1-44, "In contrast, with...the system clock")

Carrieri et al teaches,

- neural networks for scaling data (column 1, lines 57-65, "Known infrared absorption...convergence is attained")

Motivation - The portions of the claimed apparatus would have been a highly desirable feature in this art for recognizing groups (Carrieri et al, column 7, lines 62-64, "When detecting multiple ... constant intensity proportion") ensuring accurate and reliable detection with flexible data rates (Richards et al, Abstract, "An ASIC chip...aircraft operational environment"), classifying event patterns (Eckmiller et al, page 645,

paragraph 2, "Recognition and Tracking ... of neuron C"), reducing transmission in cluttered environments (*Johnson*, column 2, lines 23-58, "the receptive field...in the scene") and performing detection of two-dimensional images (*Iwata et al*, column 1, lines 62-67, "To solve the...as an image"; column 2, lines 1-5, "figure, etc., compression...images, figures, etc."). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to modify *Fukushima* as taught by *Carrieri et al, Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the purpose of recognizing groups, ensuring accurate/reliable detection, classifying event patterns, reducing transmission and performing detection.

Regarding claim 40:

The rejection of claim 40 is the same as that for claim 38 as recited above since the stated limitations of the claim are set forth in the references.

Claims 39 and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Fukushima* in view of *Eckmiller et al* in view of *Johnson* in further view of *Iwata et al* in further view of *Richards et al* in further view of *Carrieri et al* and in further view of *Macleod et al* USPN 6,081,660 (June 27, 2000 Patent Date; August 25, 1997 102e/371 Date).

Regarding claim 39:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and performs detection related to a plurality of predetermined features on a pattern input by the input means so as to detect a predetermined pattern included in the pattern (column 4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another signal processing element or outside in response to an input from the input means or another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is shown... of "2" appears")

- the plurality of signal processing elements comprises:

- a feature detection element that belongs to a feature detection layer for extracting a predetermined feature, and a feature integration element that belongs to a feature integration layer that integrates outputs from the feature detection layer according to a predetermined method and outputs a result of the integration (Fig. 1)

- the predetermined ones among the plurality of signal processing elements are the feature detection elements that receive inputs from a plurality of the feature integration elements (Figs. 7-14)

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range, the feature

detection layer detects a plurality of features for a plurality of resolutions or scale levels

for a pattern received from the input means or population coding while *Johnson*

teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- wherein the feature detection layer detects a plurality of features for a plurality of

resolutions or scale levels for a pattern received from the input means (column 23, lines

43-67, "Timing Adjustment of...faster system clock"; column 24, lines 1-44, "In contrast,

with...the system clock")

- wherein the feature integration element comprises an element for sub-sampling

feature data in a local receptive field region, and a population coding element for

integrating the outputs of the sub-sampling elements that extend over a plurality of

resolutions or scale levels (column 22, lines 13-49, "the transmit path...and PPM

waveforms")

Carrieri et al teaches,

- neural networks for scaling data (column 1, lines 57-65, "Known infrared

absorption...convergence is attained")

Macleod et al teaches,

- wherein the feature integration element comprises an element for sub-sampling

feature data in a local receptive field region, and a population coding element for

integrating the outputs of the sub-sampling elements that extend over a plurality of

resolutions or scale levels (column 2, lines 11-27, "In the comparison...not too great")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for extending verification coverage (*Macleod et al*, column 2, lines 29-

66, "hitherto inexplicable errors...in the cohort"), recognizing groups (*Carrieri et al*,

column 7, lines 62-64, "When detecting multiple ... constant intensity proportion")

ensuring accurate and reliable detection with flexible data rates (*Richards et al*,

Abstract, "An ASIC chip...aircraft operational environment"), classifying event patterns

(*Eckmiller et al*, page 645, paragraph 2, "Recognition and Tracking ... of neuron C"),

reducing transmission in cluttered environments (*Johnson*, column 2, lines 23-58, "the

receptive field...in the scene") and performing detection of two-dimensional images

(*Iwata et al*, column 1, lines 62-67, "To solve the...as an image"; column 2, lines 1-5,

"figure, etc., compression...images, figures, etc."). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made, to modify

Fukushima as taught by *Macleod et al, Carrieri et al, Richards et al, Eckmiller et al,*

Johnson and *Iwata et al* for the purpose of extending verification coverage, recognizing

groups, ensuring accurate/reliable detection, classifying event patterns, reducing

transmission and performing detection.

Regarding claim 45:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or scale levels on patterns received from the input means (column 25, lines 16-18, "We will now...network is L = 3")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the plurality of signal processing elements outputs a pulse signal with an output value corresponding to an arrival time pattern of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range, processing at different scale levels or resolutions or multiplex processing while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page 643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies ... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ... visual stimulus features") outputs a pulse signal (Fig. 1) with an output value corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing elements within a predetermined time range (page 645, paragraph 1, "The fully parallel ... recently been published"; page 647, paragraph 1, "Simulation results showed ... already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to another signal processing element or outside in response to an input from the input means or another signal processing element (Abstract, "The pulse-coupled automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- the pattern detecting means comprises:

- a plurality of processing means for implementing processing for different resolutions or

scale levels on patterns received from the input means (column 14, lines 11-60, "The

high data rate...time of arrival")

- multiplex processing means for coupling the outputs of the plurality of processing

means (Fig. 11, item 1118)

- wherein each of the plurality of processing means comprises a plurality of feature

detection elements, as the signal processing elements, that detect and output a plurality

of features associated with individual points obtained by sampling the input data

according to a predetermined method (column 22, lines 13-49, "the transmit path...and

PPM waveforms")

- the multiplex processing means couples the outputs of the plurality of feature detection

elements (Fig. 18, items 414, 1830, 1832)

Carrieri et al teaches,

- neural networks for scaling data (column 1, lines 57-65, "Known infrared

absorption...convergence is attained")

- the plurality of processing means comprises a plurality of channels that individually

implement processing at different scale levels or resolutions by employing groups of

neurons having hierarchical structures (Abstract, "A four-layer neural...known

microprocessor chips"; column 8, lines 25-44, "The network is...per input PE")

- the multiplexing means comprises a group of population coding neurons that integrate

outputs of a plurality of channels (Abstract, "A four-layer neural...known microprocessor

chips"; column 8, lines 25-44, "The network is...per input PE")

Macleod et al teaches,

- wherein the feature integration element comprises a population coding element for

integrating the outputs (column 2, lines 11-27, "In the comparison...not too great")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for extending verification coverage (Macleod et al, column 2, lines 29-

66, "hitherto inexplicable errors...in the cohort"), recognizing groups (Carrieri et al,

column 7, lines 62-64, "When detecting multiple ... constant intensity proportion")

ensuring accurate and reliable detection with flexible data rates (Richards et al,

Abstract, "An ASIC chip...aircraft operational environment"), classifying event patterns

(Eckmiller et al, page 645, paragraph 2, "Recognition and Tracking ... of neuron C"),

reducing transmission in cluttered environments (Johnson, column 2, lines 23-58, "the

receptive field...in the scene") and performing detection of two-dimensional images

(Iwata et al, column 1, lines 62-67, "To solve the...as an image"; column 2, lines 1-5,

"figure, etc., compression...images, figures, etc."). Therefore, it would have been

obvious to one of ordinary skill in the art at the time the invention was made, to modify

Fukushima as taught by *Macleod et al, Carrieri et al, Richards et al, Eckmiller et al,*

Johnson and *Iwata et al* for the purpose of extending verification coverage, recognizing

groups, ensuring accurate/reliable detection, classifying event patterns, reducing

transmission and performing detection.

Regarding claim 46:

The rejection of claim 46 is the same as that for claim 45 as recited above since the

stated limitations of the claim are met by the references.

Regarding claim 47:

The rejection of claim 47 is the same as that for claim 45 as recited above since the

stated limitations of the claim are met by the references.

Claims 48-50 and 54-65 are rejected under 35 U.S.C. 103(a) as being

unpatentable over *Fukushima* in view of *Eckmiller et al* in view of *Johnson* in view of

Iwata et al in view of *Richards et al* and in further view of *Moore et al* "The

Implementation of a Multi-View Autostereoscopic Display" (October 15, 1992).

Regarding claim 48:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range, sampling or

fixation region setting control while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- the plurality of feature detection elements in a plurality of hierarchies for detecting a

plurality of features in correspondence with points obtained by sampling the patterns

received from the input means according to a predetermined method (column 22, lines

13-49, "the transmit path...and PPM waveforms")

Moore et al teaches,

- fixation region setting control means for controlling the setting of a fixation region

associated with an output of a lower layer of the plurality of hierarchies on the basis of

the distributions of feedback signals from an upper layer of the plurality of hierarchies

(page 4/1, paragraphs 1-3, "A novel autostereoscopic...suitable signal source")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for simplifying optical system implementation (*Moore et al*, page 4/1,

paragraphs 4-6, "The advantage of...for all views"), ensuring accurate and reliable

detection with flexible data rates (*Richards et al*, Abstract, "An ASIC chip...aircraft

operational environment"), classifying event patterns (*Eckmiller et al*, page 645,

paragraph 2, "Recognition and Tracking ... of neuron C"), reducing transmission in

cluttered environments (*Johnson*, column 2, lines 23-58, "the receptive field...in the

scene") and performing detection of two-dimensional images (*Iwata et al*, column 1,

lines 62-67, "To solve the...as an image"; column 2, lines 1-5, "figure, etc.,

compression...images, figures, etc."). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made, to modify *Fukushima* as

taught by *Moore et al, Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the

purpose of simplifying optical system implementation, ensuring accurate/reliable

detection, classifying event patterns, reducing transmission and performing detection.

Regarding claim 49:

The rejection of claim 49 is similar to that for claim 48 as recited above since the stated

limitations of the claim are set forth in the references. Claim 49's limitations difference

is taught in *Moore et al*:

- wherein the fixation region setting control means updates a set position or size of a

fixation region (Figs. 2-4)

Therefore, claim 49 is rejected under the same rationale as claim 48.

Regarding claim 50:

The rejection of claim 50 is similar to that for claim 48 as recited above since the stated

limitations of the claim are set forth in the references.   Claim 50's limitations difference

is taught in *Fukushima*:

- the pattern detecting means comprises salience detecting elements for detecting the

salience of features and a coupling means for coupling the elements and transmitting

signals, and forms a plurality of element layers for low-order to high-order features (Fig.

1)

- the connecting means comprises feedback connecting means for transmitting signals

from an element layer for a high-order feature to an element layer for a feature of a

lower order (Figs. 11-12)

Moore et al:

- the fixation region setting control means controls the setting of a fixation region for low-

order feature data or input data on the basis of the feature salience level and a signal

transmission amount obtained by the feedback connecting means (Figs. 2-4; page 4/10,

section 5.1, first paragraph, "The signals to... μSecs to settle")

Regarding claim 54:

The rejection of claim 54 is similar to that for claim 50 as recited above since the stated

limitations of the claim are set forth in the references.   Claim 54's limitations difference

is taught in *Fukushima*:

- wherein the fixation region setting control means controls the setting of a fixation

region as an active receptive field of a feature detection element that belongs to a low-

order feature detection layer (column 17, lines 12-36, "the density of... pattern, are

extracted")

Regarding claim 55:

The rejection of claim 55 is similar to that for claim 50 as recited above since the stated

limitations of the claim are set forth in the references. Claim 55's limitations difference

is taught in *Fukushima*:

- wherein the fixation region setting control means receives a feedback connection from

an upper layer that outputs information regarding the position of an object that belongs

to the category to be recognized and regarding a probability of existence, and a

feedback connection from an intermediate layer that outputs information regarding the

position of a medium-order feature of an object of a category to be recognized and

regarding a probability of existence, and gives priority to a feedback input from the

upper layer when searching for the object, or to a feedback input from the intermediate

layer when recognizing the object (column 8, lines 24-39, "only a part... can be realized")

Regarding claim 56:

The rejection of claim 56 is similar to that for claim 50 as recited above since the stated

limitations of the claim are set forth in the references. Claim 56's limitations difference

is taught in *Moore et al*:

- wherein the fixation region setting control means reduces a temporal change in the

central position of a fixation region when a predetermined degree of gaze is high (page

4/8, section 4.1.1, "The human eyes... and 16 of 1°")

Regarding claim 57:

The rejection of claim 57 is similar to that for claim 55 as recited above since the stated

limitations of the claim are set forth in the references. Claim 57's limitations difference

is taught in *Fukushima*:

- wherein the degree of attention takes a monotone increase function value of a

feedback signal level from the upper layer (column 18, lines 28-68, "The inhibitory

cell...is also activated")

Regarding claim 58:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network...single line showing"; column 5, lines 1-22, "the

existence of...in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the...new response thus'; column 26, lines 1-6, 'elicited is

shown...of "2" appears")

- the plurality of signal processing elements comprises:

- a feature detection element that belongs to a feature detection layer for extracting a

predetermined feature, and a feature integration element that belongs to a feature

integration layer that integrates outputs from the feature detection layer according to a

predetermined method and outputs a result of the integration (Fig. 1)

- the predetermined ones among the plurality of signal processing elements are the

feature detection elements that receive inputs from a plurality of the feature integration

elements (Figs. 7-12)

- feedback connecting means for transmitting signals from an upper layer to a lower

layer in a hierarchical network structure combining the feature detection layers and the

feature integration layers (Figs. 1, 7-12)

- the feature detection layer or the feature integration layer comprises a salience

detecting element for detecting the salience of a feature (Fig. 14, item 64; Fig. 14, item

70)

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range, the feature

detection layer extracts a plurality of features of reach of a plurality of resolutions or

scale levels or fixation region setting control means that issues control signals related to

a fixation region on the basis of a signal from the feedback connecting means and the

salience level of a feature while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- wherein the feature detection layer extracts a plurality of features of reach of a plurality

of resolutions or scale levels (column 14, lines 11-60, "The high data rate... time of

arrival")

Moore et al teaches,

- fixation region setting control means that issues control signals related to a fixation.

region on the basis of a signal from the feedback connecting means and the salience

level of a feature (page 4/1, paragraphs 1-3, "A novel autostereoscopic... suitable signal

source"; page 4/10, section 5.1, "The signals to... for the display")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for simplifying optical system implementation (*Moore et al*, page 4/1,

paragraphs 4-6, "The advantage of... for all views"), ensuring accurate and reliable

detection with flexible data rates (*Richards et al,* Abstract, "An ASIC chip... aircraft

operational environment"), classifying event patterns (*Eckmiller et al*, page 645,

paragraph 2, "Recognition and Tracking ... of neuron C"), reducing transmission in

cluttered environments (*Johnson*, column 2, lines 23-58, "the receptive field... in the

scene") and performing detection of two-dimensional images (*Iwata et al*, column 1,

lines 62-67, "To solve the... as an image"; column 2, lines 1-5, "figure, etc.,

compression... images, figures, etc."). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made, to modify *Fukushima* as

taught by *Moore et al, Richards et al, Eckmiller et al, Johnson* and *Iwata et al* for the

purpose of simplifying optical system implementation, ensuring accurate/reliable

detection, classifying event patterns, reducing transmission and performing detection.

Regarding claim 59:

The rejection of claim 59 is similar to that for claim 58 as recited above since the stated

limitations of the claim are set forth in the references. Claim 59's limitations difference

is taught in *Fukushima*:

- wherein the fixation region setting control means sets the size of a fixation region on

the basis of a detected scale level associated with the pattern that belongs to a category

to be recognized (column 4, lines 38-47, "A human being...a human being"; column 17,

lines 43-55, "in the afferent ... the stimulus pattern")

Regarding claim 60:

The rejection of claim 60 is similar to that for claim 49 as recited above since the stated

limitations of the claim are set forth in the references. Claim 60's limitations difference

is taught in *Moore et al*:

- fixation region setting means for setting a fixation region (page 4/10, section 5.1,

paragraph 5, "The PC acts...for the display")

- determining means for determining photographing conditions on the basis of a fixation

region set by the fixation region setting means (page 4/8, paragraph 3, "The slot

shutter...have high brightness"; page 4/9, section 4.1.3, "Sequential views

are...transmission Contrast Ratio")

- memory means for storing model data regarding an object to be photographed (page

4/10, section 5.1, paragraph 4, "The DRAM holds...give moving pictures")

- wherein the fixation region setting means sequentially updates a fixation region to

search for a fixation region that meets a predetermined requirement regarding the

model data thereby to set the fixation region under the control by the fixation region

setting control means of the pattern detecting apparatus according to Claim 49 (page

4/10, section 5.1, paragraphs 1-3, "The signals to... on the card")

Regarding claim 61:

The rejection of claim 61 is similar to that for claim 60 as recited above since the stated

limitations of the claim are set forth in the references. Claim 61's limitations difference

is taught in *Fukushima*:

- initializing means for initializing a fixation region in a photographic standby state

(column 21, lines 2-11, "The positive constant... and Kandel 1976"; column 22, lines 11-

23, "the efficiency of... should exists there")

Regarding claim 62:

The rejection of claim 62 is similar to that for claim 60 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 63:

The rejection of claim 63 is similar to that for claim 60 as recited above since the stated

limitations of the claim are set forth in the references.

Regarding claim 64:

The rejection of claim 64 is similar to that for claim 49 as recited above since the stated

limitations of the claim are set forth in the references. Claim 64's limitations difference

is taught in *Moore et al*:

- fixation region setting means for setting a fixation region (page 4/10, section 5.1,

paragraph 5, "The PC acts... for the display")

- determining means for determining photographing conditions on the basis of a fixation

region set by the fixation region setting means (page 4/8, paragraph 3, "The slot

shutter...have high brightness"; page 4/9, section 4.1.3, "Sequential views

are...transmission Contrast Ratio")

- fixation position detecting means for detecting a fixation position on the basis of a

user's visual axis (page 4/1, paragraph 3, "The display described...suitable signal

source")

- wherein the fixation region setting means searches for and sets a fixation region on

the basis of the fixation position under the control by the fixation region setting control

means of the pattern detecting apparatus according to Claim 49 (page 4/10, section 5.1,

paragraphs 1-3, "The signals to...on the card")

Regarding claim 65:

The rejection of claim 65 is the same as that for claim 64 as recited above since the

stated limitations of the claim are set forth in the references.

Claims 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Fukushima in view of *Eckmiller et al* in view of *Johnson* in further view of *Iwata et al* in

view of *Richards et al* in view of *Warren et al* USPN 4,577,344 (March 18, 1986) and

further in view of *Moore et*.

Regarding claim 51:

Fukushima teaches,

- input means for inputting a pattern (Fig. 1)

- pattern detecting means that comprises a plurality of signal processing elements and

performs detection related to a plurality of predetermined features on a pattern input by

the input means so as to detect a predetermined pattern included in the pattern (column

4, lines 58-68, "the neural network... single line showing"; column 5, lines 1-22, "the

existence of... in FIG. 2")

- wherein each of the plurality of signal processing elements outputs a signal to another

signal processing element or outside in response to an input from the input means or

another signal processing element (Figs. 7-14)

- predetermined ones among the plurality of signal processing elements output signals

with outputs based on arrival time patterns of a plurality of signals (column 25, lines 34-

68, 'FIGS. 16-18 show the... new response thus'; column 26, lines 1-6, 'elicited is

shown... of "2" appears")

- the pattern detecting means comprises salience detecting elements for detecting the

salience of features and a coupling means for coupling the elements and transmitting

signals, and forms a plurality of element layers for low-order to high-order features (Fig.

1)

- the connecting means comprises feedback connecting means for transmitting signals

from an element layer for a high-order feature to an element layer for a feature of a

lower order (Figs. 11-12)

- priority level calculating means for determining the priority level of a fixation positions

at sampling points of each piece of input data on the basis of a signal transmission

amount received from the feedback connecting means and the salience level of a low-

order feature (column 24, lines 24-39, "The influence of...more features

simultaneously")

- fixation position setting means for setting fixation positions in a descending order of

priority levels on the basis of a distribution of priority levels (column 23, lines 61-66,

"The situation in ... of all stages")

However, *Fukushima* doesn't explicitly teach each of predetermined ones among the

plurality of signal processing elements outputs a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range, sampling,

fixation region setting control or priority levels while *Eckmiller et al* teaches,

- each of predetermined ones among the plurality of signal processing elements (page

643, Computational Neuroscience section, paragraph 2, "Various neuroscientific studies

... 1985. Other studies" and page 644, paragraph 1, "discussed the generation ...

visual stimulus features") outputs a pulse signal (Fig. 1) with an output value

corresponding to an arrival time pattern (Abstract, "Most current artificial ... the nervous

system"; Fig. 2) of a plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (page 645, paragraph 1, "The fully parallel

... recently been published"; page 647, paragraph 1, "Simulation results showed ...

already caused non-recognition")

Johnson teaches,

- wherein each of the plurality of signal processing elements outputs a pulse signal to

another signal processing element or outside in response to an input from the input

means or another signal processing element (Abstract, "The pulse-coupled

automatic...to the segment"; Fig. 1)

Iwata et al teaches,

- predetermined ones among the plurality of signal processing elements output pulse

signals (Figs. 1A, 2A, 8B, 9-10, 13A-B; column 13, lines 42-52, "The dynamic

range...from easily degrading"; column 6, lines 22-45, "FIG. 7 shows an...high relative

accuracy")

Richards et al teaches,

- the plurality of feature detection elements in a plurality of hierarchies for detecting a

plurality of features in correspondence with points obtained by sampling the patterns

received from the input means according to a predetermined method (column 22, lines

13-49, "the transmit path...and PPM waveforms")

Moore et al teaches,

- the fixation region setting control means controls the setting of a fixation region for low-

order feature data or input data on the basis of the feature salience level and a signal

transmission amount obtained by the feedback connecting means (Figs. 2-4; page 4/10,

section 5.1, first paragraph, "The signals to...µSecs to settle")

- fixation region setting control means for controlling the setting of a fixation region

associated with an output of a lower layer of the plurality of hierarchies on the basis of

the distributions of feedback signals from an upper layer of the plurality of hierarchies

(page 4/1, paragraphs 1-3, "A novel autostereoscopic...suitable signal source")

Warren et al teaches,

- priority level calculating means for determining the priority level of a fixation positions

at sampling points of each piece of input data on the basis of a signal transmission

amount received from the feedback connecting means and the salience level of a low-

order feature (column 6, lines 17-29, "Bus register 134 allows...when timer 130 is

active")

Motivation - The portions of the claimed apparatus would have been a highly desirable

feature in this art for interleaving memory-to-memory transfers without conflict or

sacrificing performance (*Warren et al*, column 6, lines 29-36, "Timer 130 allows

computer...master request bus 40"), simplifying optical system implementation (*Moore

et al*, page 4/1, paragraphs 4-6, "The advantage of...for all views"), ensuring accurate

and reliable detection with flexible data rates (*Richards et al,* Abstract, "An ASIC

chip...aircraft operational environment"), classifying event patterns (*Eckmiller et al*, page

645, paragraph 2, "Recognition and Tracking ... of neuron C"), reducing transmission in

cluttered environments (*Johnson*, column 2, lines 23-58, "the receptive field...in the

scene") and performing detection of two-dimensional images (*Iwata et al*, column 1,

lines 62-67, "To solve the...as an image"; column 2, lines 1-5, "figure, etc.,

compression...images, figures, etc."). Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made, to modify *Fukushima* as

taught by *Warren et al, Moore et al, Richards et al, Eckmiller et al, Johnson* and *Iwata et

al* for the purpose of interleaving memory-to-memory transfers, simplifying optical

system implementation, ensuring accurate/reliable detection, classifying event patterns,

reducing transmission and performing detection.

Regarding claim 52:

The rejection of claim 52 is similar to that for claim 51 as recited above since the stated

limitations of the claim are met by the references. Claim 52's limitations difference is

taught in *Richards et al*:

- counting means for counting the number of searches for fixation positions (column 3,

lines 8-32, "In another aspect...high speed sampling"; column 8, lines 47-57, "The

receive data...from the down-converter 222")

- control means for controlling a permissible range of priority levels wherein fixation

positions can be set by the fixation position setting means on the basis of the number of

searches for fixation positions (Fig. 4, item 210)

Regarding claim 53:

The rejection of claim 53 is similar to that for claim 51 as recited above since the stated

limitations of the claim are met by the references. Claim 53's limitations difference is

taught in *Richards et al*:

- the detecting means comprises a plurality of processing channels associated with a

plurality of scale levels or resolutions (column 7, lines 56-67, "The processor

interface...transmit data path 512")

- the fixation region setting control means controls the size of a fixation region on the

basis of the processing channel to which a feature selected based on the priority level

belongs (column 18, lines 23-36, "Information can be ... bit is indicated")

RESPONSE TO APPLICANTS' AMENDMENT REMARKS

Objections - Information Disclosure Statement (IDS), Drawings and Specification

Applicant argues that the Supplemental IDS addresses the Examiner's objections

(Amendment REMARKS page 35, paragraph 2). Applicant's arguments have been fully

considered, and are persuasive. The Examiner appreciates the additional information,

but was unable to consider Japanese document numbers 2879670, 2717662, 2941847

and 2763296 due to missing English version of the Abstracts. The objections to the

8/1/01 IDS are withdrawn.

Applicant argues that the corrected drawings address the Examiner's objections

(Amendment REMARKS page 35, paragraph 3). Applicant's arguments have been fully

considered. Except for the missing label of Fig. 39, item 3903 (vs. specification page

166, lines 17-18) the drawings objections are withdrawn.

Applicant argues that informalities objected to in the specification have been

addressed in 9/10/04 amendment (Amendment REMARKS, page 35, paragraph 4).

Applicant's arguments have been fully considered. Except for the substitution of 3902

for 3901 on page 166, line 17, the specification objections are withdrawn.

Claim Rejections - 35 USC § 101

Applicant argues that claim 66 is now directed to a computer-implemented

pattern detecting method (Amendment REMARKS page 35, paragraph 5). Applicant's

arguments have been fully considered and are persuasive. The 35 USC 101 rejection

of claim 66 is withdrawn.

Claim Rejections - 35 USC § 103

Applicant(s) argue(s) that Fukushima USPN 5,058,184 fails to disclose claims 1's

predetermined ones of a plurality of signal processing elements output a pulse signal

with an output value corresponding to an arrival time pattern of a plurality of pulse

signals input from a plurality of signal processing elements within a predetermined time

range (Amendment REMARKS page 37, paragraph 1), Johnson USPN 5,664,065 fails

to disclose claims 1's plurality of pulse signals input from a plurality of signal processing

elements within a predetermined time range (Amendment REMARKS page 37,

paragraph 2 and page 38, paragraph 1), Iwata USPN 6,088,490 fails to disclose claims

1's predetermined ones of a plurality of signal processing elements output a pulse

signal with an output value corresponding to an arrival time pattern of a plurality of pulse

signals input from a plurality of signal processing elements within a predetermined time

range (Amendment REMARKS page 38, paragraph 2) and that the combination of

Fukushima, Johnson and Iwata cannot be said to disclose or suggest Applicant's

invention as claimed in independent claim 1 (Amendment REMARKS page 38,

paragraph 3 and page 39, paragraph 1). Applicant's arguments have been fully

considered, but are moot in view of the above new grounds of rejection.

The examiner agrees that Fukushima, Johnson and Iwata taken either

individually or in combination do not disclose the invention defined in claim 1. However,

Eckmiller "Information Processing in Biology-Inspired Pulse Coded Neural Networks"

page 643, Computational Neuroscience section, paragraph 2, page 644, paragraph 1,

Figs. 1-2, the Abstract, page 645, paragraph 1 and page 647, paragraph 1 are cited in

combination with Fukushima, Johnson and Iwata for explicitly and inherently disclosing

the subject matter set forth in the claims by the applicants: predetermined ones of a

plurality of signal processing elements output a pulse signal with an output value

corresponding to an arrival time pattern of a plurality of pulse signals input from a

plurality of signal processing elements within a predetermined time range. Furthermore,

Eckmiller page 645, paragraph 2 provides classifying event patterns as the purpose and

motivation for modifying Fukushima.

Applicant argues that claim 66 is substantially in accordance with the apparatus of

claim 1 and its arguments for allowance (Amendment REMARKS page 39, paragraph 2)

and that claims dependent from independent claim 1 are patentable for the same

reasons claim 1 is believed to be patentable (Amendment REMARKS page 39,

paragraph 3). Applicant's arguments have been fully considered, but are moot in view

of the above new grounds of rejection. In addition to the above 35 USC 103 rejection of

claims, dependent claims are not believed to be patentable for being dependent on a

rejected independent claim.

As set forth above with regards to Fukushima, Eckmiller, Johnson and Iwata, the

items listed explicitly and inherently teach each element of the applicants' claimed

limitations. Applicants have not set forth any distinction or offered any dispute between

the claims of the subject application, Fukushima's Hierarchical information processing

system, Eckmiller's Information Processing in Biology-Inspired Pulse Coded Neural

Networks, Johnson's Pulse-coupled automatic object recognition system dedicatory

clause and Iwata's apparatus for processing two-dimensional information.

Conclusion

The following prior art made of record is considered pertinent to applicant's

disclosure:

- *Nagata et al*; JP 10269345 A; TWO-DIMENSIONAL INFORMATION PROCESSOR

Any inquiry concerning this communication or earlier communications from the

Office should be directed to Meltin Bell whose telephone number is 571-272-3680. This

Examiner can normally be reached on Mon - Fri 7:30 am - 4:00 pm.
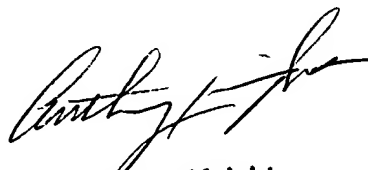
If attempts to reach this Examiner by telephone are unsuccessful, his supervisor,

Anthony Knight, can be reached on 571-272-3687. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is 571-272-

2100.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

MB
December 13, 2004

Anthony Knight
Supervisory Patent Examiner
Group 3600